

**NOISE REDUCTION STUDY**  
**WITHIN MARICOPA COUNTY**

**NOISE STUDY TECHNICAL REPORT**

**November 2007**

*Prepared for:*



**Arizona Department  
of Transportation**

# **NOISE REDUCTION STUDY WITHIN MARICOPA COUNTY**

## **NOISE STUDY TECHNICAL REPORT**

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# 1.0 INTRODUCTION

On May 24, 2007, Maricopa Association of Governments (MAG) issued a solicitation of projects to utilize the remaining \$20 million of noise mitigation funds that were part of Proposition 400. The purpose of the program is to address noise mitigation in residential areas where traffic noise substantially increased due to overall increases in traffic volume on the MAG Regional Freeway System. The original intent of the program was to mitigate noise in areas not eligible (**lower than Arizona Department of Transportation (ADOT) Noise Abatement Policy action level**) for noise mitigation through the normal ADOT process, i.e., areas that are scheduled for roadway improvements through 2025.

This preliminary noise reduction study was developed to focus on the areas of concern and prioritize accordingly.

For a better understanding of noise level, a copy of the ADOT Noise Abatement Policy (reviewed and approved by FHWA) is provided as a separate attachment for your review.



## 2.0 POTENTIAL NOISE BARRIER LOCATIONS

The **City of Phoenix** potential areas for noise reduction submitted are as follows:

- North side residents of Interstate 10 (I-10), from 7th Avenue to 15th Avenue
- Southeast corner (SEC) of 51st Avenue and Loop 101 (Agua Fria Freeway) (Overland Hills development just east of the SEC)
- East side residents of I-17, just south of Camelback (two-story condominiums)
- Northeast Corner (NEC) of 7th Street and Loop 101
- 40th Street and the State Route 51 (SR 51)
- SR 51 and the Greenway Parkway

The potential area at 40th Street and the SR 51 was excluded from further analysis because a 16-foot barrier is present that already protects the customers.

The **City of Scottsdale** potential areas for noise reduction submitted are as follows:

- Northwest corner (NWC) of SR 101 and Cactus Road
- NWC of SR 101 and 90th Street

The **City of Peoria** potential areas for noise reduction submitted are as follows:

- West side residents of SR 101, from North Avenue to Olive Avenue
- West side residents of SR 101, from Olive Avenue to Peoria Avenue
- East side residents of SR 101, from Peoria Avenue to Grand Avenue

The **City of Glendale** potential areas for noise reduction are as follows:

- SR 101, south side from 51st Avenue to 58th Avenue
- SR 101, east/south side from Union Hills Drive to 75th Avenue
- SR 101, both sides from 59th Avenue to 75th Avenue

The potential areas from the City of Glendale were excluded from further analysis because noise barriers already protect the customers.

The **Maricopa County** potential area for noise reduction submitted is as follows:

- SR 303, Deer Valley Road to north of Robertson Drive

The locations of these potential areas are shown in Appendix A.

### 3.0 EXISTING NOISE LEVELS

Noise level monitoring was conducted at 26 sites for the potential areas of noise reduction described above (monitor number is labeled "MON") to document existing traffic noise level conditions. The monitoring results are summarized in Table 1.

Jurisdiction	Monitor Number	Address/Description	Major Freeway	Monitoring Result Leq, dBA
Phoenix	MON-01	NWC, 9th Avenue and Moreland Street	I-10	59
	MON-02	NWC, 11th Avenue and Moreland Street	I-10	61
	MON-03	NWC, 13th Avenue just south of Culver Street	I-10	62
Scottsdale	MON-04	SWC, End of the cul-de-sac at East San Rafael Drive	SR 101	58
	MON-05	West side of freeway just south of East Via Linda	SR 101	59
	MON-06	SWC, Larkspur Drive and 87th Street	SR 101	58
	MON-07	SWC, Sweetwater Avenue and 87th Street	SR 101	53
Phoenix	MON-08	NWC, East Waltann Lane and 35th Street	SR 51	56
	MON-09	SWC, North 10th Place and East Pontiac Drive	SR 101	62
	MON-10	NE of West Highland Avenue and Black Canyon Highway frontage Road	I-17	66
Peoria	MON-11	Northwest of North 95th Avenue and West Las Palmaritas Drive	SR 101	60
	MON-12	SW of North 92nd Drive and West Sanna Circle	SR 101	59
	MON-13	SW of North 92nd Drive and West Mountain View Road	SR 101	62
	MON-14	Northwest of West Mountain View Road between 92nd Drive and 94th Avenue	SR 101	50
	MON-15	Northwest of 92nd Drive and West Monroe Street	SR 101	61
	MON-16	Behind the first row in the Mobile Home Park	SR 101	56
	MON-17	In front of the first row in the Mobile Home Park	SR 101	62
	MON-18	SW of West Yucca Street and North 93rd Avenue	SR 101	59
Glendale	MON-19	Northwest of West Kerry Way and North 79th Drive	SR 101	58
	MON-20	NE of North 77th Avenue and West Escuda Road	SR 101	55
	MON-21	SE of West Beardsley Road and Arrowhead Lakes Condominiums	SR 101	60
	MON-22	SW of North 53rd Avenue and West Escuda Road	SR 101	58
	MON-23	SW of North 70th Drive and cul-de-sac	SR 101	58
Phoenix	MON-24	Playground, SEC, West Menadota Drive and North 48th Lane	SR 101	58
	MON-25	4762 West Menadota Drive (backyard)	SR 101	61
Maricopa County	MON-26	15435 West Robertson Drive	SR 303	56

The monitoring locations represent the general noise levels of the neighborhoods adjacent to the freeways. Detailed noise level monitoring information is located in Appendix B of this report, and the photos for these locations are shown in Appendix C.

## 4.0 PRIORITIZATION

Appendix D shows the matrix of potential noise barrier priorities and detailed information. The priorities for the noise barriers are rated based on factors including existing monitoring noise levels, number of benefited customers, project costs, and whether freeway improvements will be made within 10 years. The project cost is calculated based on the barrier length and barrier height proposed by each jurisdiction, with a unit cost of \$33 per square foot, and \$40 per linear foot for removal costs for existing barriers and privacy walls. Potential noise reduction measures will be considered for those areas where no freeway improvements are planned or programmed within 10 years.

The suggested priorities for all the 11 potential barriers in each jurisdiction are shown in Table 2.

Priority	Area Location	Jurisdiction
1	I-17 & Camelback Road (SEC)	City of Phoenix
2	I-10, 7th Avenue to 15th Avenue (north side)	City of Phoenix
3	SR 101 & 51st Avenue (SEC)	City of Phoenix
4	SR 101 & 7th Street (NEC)	City of Phoenix
5	SR 101, Peoria Avenue to Grand Avenue	City of Peoria
6	SR 101, Olive Avenue to Peoria Avenue	City of Peoria
7	SR 101, North Avenue to Olive Avenue	City of Peoria
8	SR 101 & 90th Street (NWC)	City of Scottsdale
9	SR 101 & Cactus Road (NWC)	City of Scottsdale
10	SR 51 & Greenway Parkway (NWC)	City of Phoenix
11	SR 303, Deer Valley Road to north of Robertson Drive	Maricopa County

The detailed information for each priority location is also illustrated in Tables 3-13. The future freeway improvement projects and plan phase are from the Regional Transportation Plan (RTP).

Priority 1: City of Phoenix, I-17 & Camelback Road (SEC)

TABLE 3 Information About Priority 1 Location	
Age of neighborhood	Property approved on 3/12/1996
Deed date for first row customers	N/A
Date of public knowledge	2/27/1957
Future freeway improvement projects	Long term capacity improvements
Plan phasing	Phase 3 (Fiscal Year (FY) 2016-2020)
Land use type	Condominium
No. of affected customers with 200 feet from potential barrier	Approximately 8
Average distance from first row to freeway	280 feet
Main noise source	I-17 mainline, ramp and frontage Road
Existing traffic volumes	AADT 2005, 213,000
Existing total through lanes	6 and High Occupancy Vehicle (HOV) lanes
Planned total through lanes	10 and HOV lanes
Measured noise levels (dBA)	66
Existing noise barrier	No
Asphalt rubber friction course (ARFC)	Yes, previous ARFC
Privacy wall	Yes, 4 feet
Other noise reduction option	N/A
Potential barrier length (feet)	Approximately 800
Potential barrier height (feet)	20
Estimated potential barrier cost	\$528,000
Estimated cost per benefited customer	\$66,000

The freeway is dominated by a large traffic volume of 213,000 annual average daily traffic (AADT) based on 2005 figures. The noise source originates not only from the mainline and ramp, but also from the frontage road. Monitoring noise level for the site located near the pool area is about 66 dBA. This is the highest noise level among all the monitoring data. No noise barrier exists at this location right now; however, there is a noise barrier about 10-12 feet between the freeway and frontage road on the northbound side from West Hazelwood Street to West Turney Avenue. A programmed future freeway improvement project is scheduled in Phase 3 (FY 2016-2020). The estimated cost of the potential barrier is about \$528,000.

Priority 2: City of Phoenix, I-10, 7th Avenue to 15th Avenue (north side)

Age of neighborhood	Properties built in 1920's - 1940's
Deed date for first row customers	One is in the year of 1958, others from 1975 to 2007
Date of public knowledge	5/8/1965
Future freeway improvement projects	No
Plan phasing	No
Land use type	Single family homes (SFH)
No. of affected customers with 200 feet from potential barrier	Approximately 40
Average distance from first row to freeway	300 feet
Main noise source	I-10 mainline and ramp
Existing traffic volumes	AADT 2005, 258,000
Existing total through lanes	10 and HOV lanes
Planned total through lanes	10 and HOV lanes
Measured noise levels (dBA)	59-62
Existing noise barrier	Yes, 9-10 feet on the customer side
Asphalt rubber friction course (ARFC)	Yes, fall 2004/spring 2005
Privacy wall	Partial
Other noise reduction option	Depressed roadway
Potential barrier length (feet)	Approximately 2,500
Potential barrier height (feet)	20
Estimated potential barrier cost	\$1,750,000
Estimated cost per benefited customer	\$43,750

Monitoring noise levels for this site for the first building row customers range from 59 to 62 dBA. A noise barrier already exists with a height of 9-10 feet on the customer side. Since this site is located within a historic district and no new freeway improvements or redevelopments are anticipated, it falls within MAG's option for potential noise reduction. In addition, this site is under political pressure for additional noise reduction.

The freeway is depressed from 7th Avenue to 11th Avenue, which results in lower noise levels at monitoring site #1 (59 dBA) and site #2 (61 dBA). The freeway becomes at grade and elevated from 11th Avenue to 15th Avenue. Therefore, the noise level at monitoring site #3 is 62 dBA. Also noted in the field measurement, there is a break in the barrier between 11th Avenue and 13th Avenue, which allows noise propagation directly to customers.

Priority 3: City of Phoenix, SR 101 & 51st Avenue (SEC)

TABLE 5 Information About Priority 3 Location	
Age of neighborhood	Properties built in 1985
Deed date for first row customers	N/A
Date of public knowledge	2/9/1984
Future freeway improvement projects	New general purpose lane (GPL) and HOV
Plan phasing	Phase 4 (FY 2021-2026)
Land use type	SFH
No. of affected customers with 200 feet from potential barrier	Approximately 28
Average distance from first row to freeway	220 feet
Main noise source	SR 101 mainline, ramp and frontage road
Existing traffic volumes	AADT 2005, 150,000
Existing total through lanes	6 lanes
Planned total through lanes	8 and HOV lanes
Measured noise levels (dBA)	58-61
Existing noise barrier	No
Asphalt rubber friction course (ARFC)	Yes, fall 2003
Privacy wall	Yes, 8 feet
Other noise reduction option	N/A
Potential barrier length (feet)	Approximately 1,300
Potential barrier height (feet)	20
Estimated potential barrier cost	\$896,000
Estimated cost per benefited customer	\$32,000

The freeway is dominated by moderate traffic volume of 150,000 AADT based on 2005 figures. Monitoring noise levels for this site for the first building row customers range from 58 to 61 dBA. The planned future freeway improvement project is not scheduled until FY 2021, which is beyond the 10 year period. The potential barrier cost is about \$896,000, with an estimated cost per benefited customer of \$32,000.

Priority 4: City of Phoenix, SR 101 & 7th Street (NEC)

TABLE 6 Information About Priority 4 Location	
Age of neighborhood	Properties built in 1999
Deed date for first row customers	N/A
Date of public knowledge	5/11/1995
Future freeway improvement projects	New GPL and HOV
Plan phasing	Phase 2 (FY 2011-2015), Phase 4 (FY 2021-2026)
Land use type	SFH
No. of affected customers with 200 feet from potential barrier	Approximately 29
Average distance from first row to freeway	250 feet
Main noise source	SR 101 mainline, ramp and frontage road
Existing traffic volumes	AADT 2005, 154,000
Existing total through lanes	6 lanes
Planned total through lanes	8 and HOV lanes
Measured noise levels (dBA)	62
Existing noise barrier	No
Asphalt rubber friction course (ARFC)	Yes, fall 2003
Privacy wall	Yes, 7.5 feet
Other noise reduction option	Depressed freeway
Potential barrier length (feet)	Approximately 1,300
Potential barrier height (feet)	20
Estimated potential barrier cost	\$896,000
Estimated cost per benefited customer	\$30,897

The freeway is dominated by moderate traffic volume of 154,000 AADT based on 2005 figures. Monitoring noise level for this site for the first building row customers is about 62 dBA. The planned future freeway improvement project is scheduled in Phase 2 between 2011 and 2015 which is within the 10 year window. The potential barrier cost is about \$896,000, with an estimated cost per benefited customer of \$30,897.

Priority 5: City of Peoria, SR 101, Peoria Avenue to Grand Avenue

TABLE 7 Information About Priority 5 Location	
Age of neighborhood	Sunset village estates approved in 1973
Deed date for first row customers	1984 - 2007
Date of public knowledge	6/21/1984
Future freeway improvement projects	New GPL and HOV
Plan phasing	Phase 3 (FY 2016-2020), Phase 4 (FY 2021-2026)
Land use type	SFH & mobile home
No. of affected customers with 200 feet from potential barrier	Approximately 21 Mobile Homes, 26 SFH
Average distance from first row to freeway	250-700 feet
Main noise source	SR 101
Existing traffic volumes	AADT 2005, 129,000
Existing total through lanes	6 lanes
Planned total through lanes	8 and HOV lanes
Measured noise levels (dBA)	56-62
Existing noise barrier	YES, Approximately 10 feet, ending at SFH
Asphalt rubber friction course (ARFC)	Yes, spring 2005
Privacy wall	Yes, 6 feet
Other noise reduction option	Setback for SFH
Potential barrier length (feet)	Approximately 3,100
Potential barrier height (feet)	20
Estimated potential barrier cost	\$2,170,000
Estimated cost per benefited customer	\$46,170

The freeway is dominated by moderate traffic volume of 129,000 AADT based on 2005 figures. Monitoring noise levels for this site for the first building row customers are about 56-62 dBA. The planned future freeway improvement project is not scheduled until in Phase 3 (FY 2016-2020). There is an existing noise barrier approximately 10 feet high. The potential barrier estimated cost is about \$2,170,000, with an estimated cost per benefited customer of \$46,170.

Priority 6: City of Peoria, SR 101, Olive Avenue to Peoria Avenue

TABLE 8 Information About Priority 6 Location	
Age of neighborhood	Properties approved in 1997
Deed date for first row customers	N/A
Date of public knowledge	6/21/1984
Future freeway improvement projects	New GPL and HOV
Plan phasing	Phase 3 (FY 2016-2020), Phase 4 (FY 2021-2026)
Land use type	SFH
No. of affected customers with 200 feet from potential barrier	Approximately 58
Average distance from first row to freeway	200 feet
Main noise source	SR 101
Existing traffic volumes	AADT 2005, 139,000
Existing total through lanes	6 lanes
Planned total through lanes	8 and HOV lanes
Measured noise levels (dBA)	50-62
Existing noise barrier	No
Asphalt rubber friction course (ARFC)	Yes, spring 2005
Privacy wall	Yes, 8 feet
Other noise reduction option	N/A
Potential barrier length (feet)	Approximately 4,500
Potential barrier height (feet)	20
Estimated potential barrier cost	\$3,150,000
Estimated cost per benefited customer	\$54,310

The freeway is dominated by moderate traffic volume of 139,000 AADT based on 2005 figures. Monitoring noise levels for this site for the first building row customers are about 50-62 dBA. The planned future freeway improvement project is not scheduled until in Phase 3 (FY 2016-2020). No existing noise barrier is located at this site. The potential barrier cost is about \$3,150,000, with an estimated cost per benefited customer of \$54,310.

Priority 7: City of Peoria, SR 101, North Avenue to Olive Avenue

TABLE 9 Information About Priority 7 Location	
Age of neighborhood	Properties approved around 1985
Deed date for first row customers	N/A
Date of public knowledge	6/21/1984
Future freeway improvement projects	New GPL and HOV
Plan phasing	Phase 3 (FY 2016-2020), Phase 4 (FY 2021-2026)
Land use type	SFH
No. of affected customers with 200 feet from potential barrier	Approximately 32
Average distance from first row to freeway	500-800 feet
Main noise source	SR 101
Existing traffic volumes	AADT 2005, 142,000
Existing total through lanes	6 lanes
Planned total through lanes	8 and HOV lanes
Measured noise levels (dBA)	60
Existing noise barrier	No
Asphalt rubber friction course (ARFC)	Yes, spring 2005
Privacy wall	Yes, 8.5 feet
Other noise reduction option	2 rows of 30 feet commercial buildings, setback
Potential barrier length (feet)	Approximately 2,500
Potential barrier height (feet)	20
Estimated potential barrier cost	\$1,750,000
Estimated cost per benefited customer	\$54,688

The freeway is dominated by moderate traffic volume of 142,000 AADT based on 2005 figures. Monitoring noise levels for this site for the first building row customers are about 58-60 dBA. The planned future freeway improvement project is not scheduled until in Phase 3 (FY 2016–2020) and Phase 4 (FY 2021-2026). There are two rows of commercial buildings, with a height of 30 feet just south of Olive Avenue. Also, the land use for the areas south of Las Palmaritas Drive is of mixed use. The estimated existing barrier cost is approximately \$1,750,000, with an estimated cost per benefited customer of \$54,688.

Priority 8: City of Scottsdale, SR 101 & 90th Street (NWC)

TABLE 10 Information About Priority 8 Location	
Age of neighborhood	Properties approved around 1978
Deed date for first row customers	1985 - 2007
Date of public knowledge	7/24/1985
Future freeway improvement projects	New GPL and HOV
Plan phasing	Phase 1 (FY 2005-2010), Phase 4 (FY 2021-2026)
Land use type	SFH
No. of affected customers with 200 feet from potential barrier	Approximately 22
Average distance from first row to freeway	200-300 feet
Main noise source	SR 101
Existing traffic volumes	AADT 2005, 146,000
Existing total through lanes	6 lanes
Planned total through lanes	8 and HOV lanes
Measured noise levels (dBA)	58-59
Existing noise barrier	Yes, approximately 9 feet on the customer side
Asphalt rubber friction course (ARFC)	Yes, ARFC test section
Privacy wall	Yes, 5-7 feet
Other noise reduction option	Buffer zone, berm inside the buffer zone
Potential barrier length (feet)	Approximately 2,700
Potential barrier height (feet)	20
Estimated potential barrier cost	\$1,890,000
Estimated cost per benefited customer	\$85,909

The freeway is dominated by moderate traffic volume of 146,000 AADT based on 2005 figures. Monitoring noise levels for this site for the first building row customers are about 58-59 dBA. The planned future freeway improvement projects are scheduled in Phase 1 (FY 2005-2010) and Phase 4 (FY 2021-2026). However, in the Phase 1 of HOV lane addition, the potential barrier is not qualified for build out because the cost per benefited customer is above ADOT NAP of \$43,000. There is an existing 9-foot noise barrier located at this site. The estimated existing barrier cost is approximately \$1,890,000, with an estimated cost per benefited customer of \$85,909.

Priority 9: City of Scottsdale, SR 101 & Cactus Road (NWC)

TABLE 11 Information About Priority 9 Location	
Age of neighborhood	Properties approved around 1988
Deed date for first row customers	N/A
Date of public knowledge	7/24/1985
Future freeway improvement projects	New GPL and HOV
Plan phasing	Phase 1 (FY 2005-2010), Phase 4 (FY 2021-2026)
Land use type	SFH
No. of affected customers with 200 feet from potential barrier	Approximately 22
Average distance from first row to freeway	250 feet
Main noise source	SR 101
Existing traffic volumes	AADT 2005, 123,000
Existing total through lanes	6 lanes
Planned total through lanes	8 and HOV lanes
Measured noise levels (dBA)	53-58
Existing noise barrier	Partial, 11 feet
Asphalt rubber friction course (ARFC)	Yes, fall 2003
Privacy wall	Yes, 7.5 feet
Other noise reduction option	Depressed freeway, berm on side, setback
Potential barrier length (feet)	Approximately 4,100
Potential barrier height (feet)	20
Estimated potential barrier cost	\$2,842,000
Estimated cost per benefited customer	\$129,182

The freeway is dominated by moderate traffic volume of 123,000 AADT based on 2005 figures. Monitoring noise levels for this site for the first building row customers are about 53-58 dBA. The planned future freeway improvement projects are scheduled in Phase 1 (FY 2005-2010) and Phase 4 (FY 2021-2026). However, in the Phase 1 of HOV lane addition, the potential barrier would not qualify for build out because the cost per benefited customer is above ADOT NAP of \$43,000. There is an existing 11-foot noise barrier located near this site. The barrier is located from Sweetwater Avenue to Voltaire Avenue. The estimated existing barrier cost is approximately \$2,842,000, with an estimated cost per benefited customer of \$129,182.

Priority 10: City of Phoenix, SR 51 & Greenway Parkway (NWC)

TABLE 12 Information About Priority 10 Location	
Age of neighborhood	Properties built in 1980's
Deed date for first row customers	1985 - 2005
Date of public knowledge	2/26/1987
Future freeway improvement projects	New GPL and HOV
Plan phasing	Phase 1 (FY 2005 -2010), Phase 4 (FY 2021-2026)
Land use type	SFH
No. of affected customers with 200 feet from potential barrier	Approximately 8
Average distance from first row to freeway	300 feet
Main noise source	SR 51 mainline and ramp
Existing traffic volumes	AADT 2005, 82,000
Existing total through lanes	6 lanes
Planned total through lanes	8 and HOV lanes
Measured noise levels (dBA)	56
Existing noise barrier	No
Asphalt rubber friction course (ARFC)	Yes, fall 2003
Privacy wall	Yes, 5.5 feet
Other noise reduction option	Berm and depressed freeway
Potential barrier length (feet)	Approximately 1,450
Potential barrier height (feet)	10
Estimated potential barrier cost	\$536,500
Estimated cost per benefited customer	\$67,063

The freeway is dominated by low traffic volume of 82,000 AADT based on 2005 figures. Monitoring noise level for the first building row customers is about 56 dBA. The planned future freeway improvement projects are scheduled in Phase 1 (FY 2005-2010) and Phase 4 (FY 2021-2026). The potential existing barrier cost is approximately \$536,500, with an estimated cost per benefited customer of \$67,063.

Priority 11: Maricopa County, SR 303, Deer Valley Road to North of Robertson Drive

TABLE 13 Information About Priority 11 Location	
Age of neighborhood	Properties approved around 1994
Deed date for first row customers	N/A
Date of public knowledge	N/A
Future freeway improvement projects	New freeway/highway construction
Plan phasing	Phase 2 (FY 2011-2015)
Land use type	SFH
No. of affected customers with 200 feet from potential barrier	Approximately 10
Average distance from first row to freeway	300-700 feet
Main noise source	SR 303
Existing traffic volumes	AADT 2005, 9,800
Existing total through lanes	4 lanes
Planned total through lanes	6 lanes
Measured noise levels (dBA)	56
Existing noise barrier	No
Asphalt rubber friction course (ARFC)	Yes
Privacy wall	Yes, 6 feet
Other noise reduction option	Setback for SFH
Potential barrier length (feet)	Approximately 1,000
Potential barrier height (feet)	14
Estimated potential barrier cost	\$502,000
Estimated cost per benefited customer	\$50,200

The freeway is dominated by low traffic volume of 9,800 AADT based on 2005 figures. Monitoring noise level for the first building row customers is about 56 dBA. The planned future freeway improvement project is scheduled in Phase 2 (FY 2011-2015). The potential existing barrier cost is approximately \$502,000, with an estimated cost per benefited customer of \$50,200.

## **CONCLUSION**

Based on the review of information regarding areas recommended for noise reduction measures and existing monitoring noise levels, a prioritization schedule was developed. Following this report, site-specific noise modeling will be necessary to develop detailed, site specific noise abatement recommendations and features.

# **APPENDIX A**

## **Monitoring Site Locations**



Statewide Noise Monitoring, August, 2007  
 Aerial Photo Date, 2004

Monitoring Location: City of Phoenix, I-10, 7th Ave. to 15th Ave. (north side)



Statewide Noise Monitoring, August 2007  
Aerial Photo Date, 2004

Monitoring Location: City of Phoenix, SR 101 and 7th Street (NEC)





Statewide Noise Monitoring, August 2007  
Aerial Photo Date, 2004

Monitoring Location: City of Phoenix, SR 101 and 51st Ave (SEC)





Statewide Noise Monitoring, August 2007  
Aerial Photo Date, 2004

Monitoring Location: City of Phoenix, SR 51 and Greenway Pkwy (NWC)





Statewide Noise Monitoring, August 2007  
Aerial Photo Date, 2004

Monitoring Location: City of Phoenix, East side of I-17, just south of Camelback (2-story condos)



Statewide Noise Monitoring, August 2007  
Aerial Photo Date, 2004

Monitoring Location: City of Phoenix, SR 51 and 40th Street





Statewide Noise Monitoring, August 2007  
 Aerial Photo Date, 2004

Monitoring Location: City of Scottsdale, SR 101 and 90th Street (NWC)

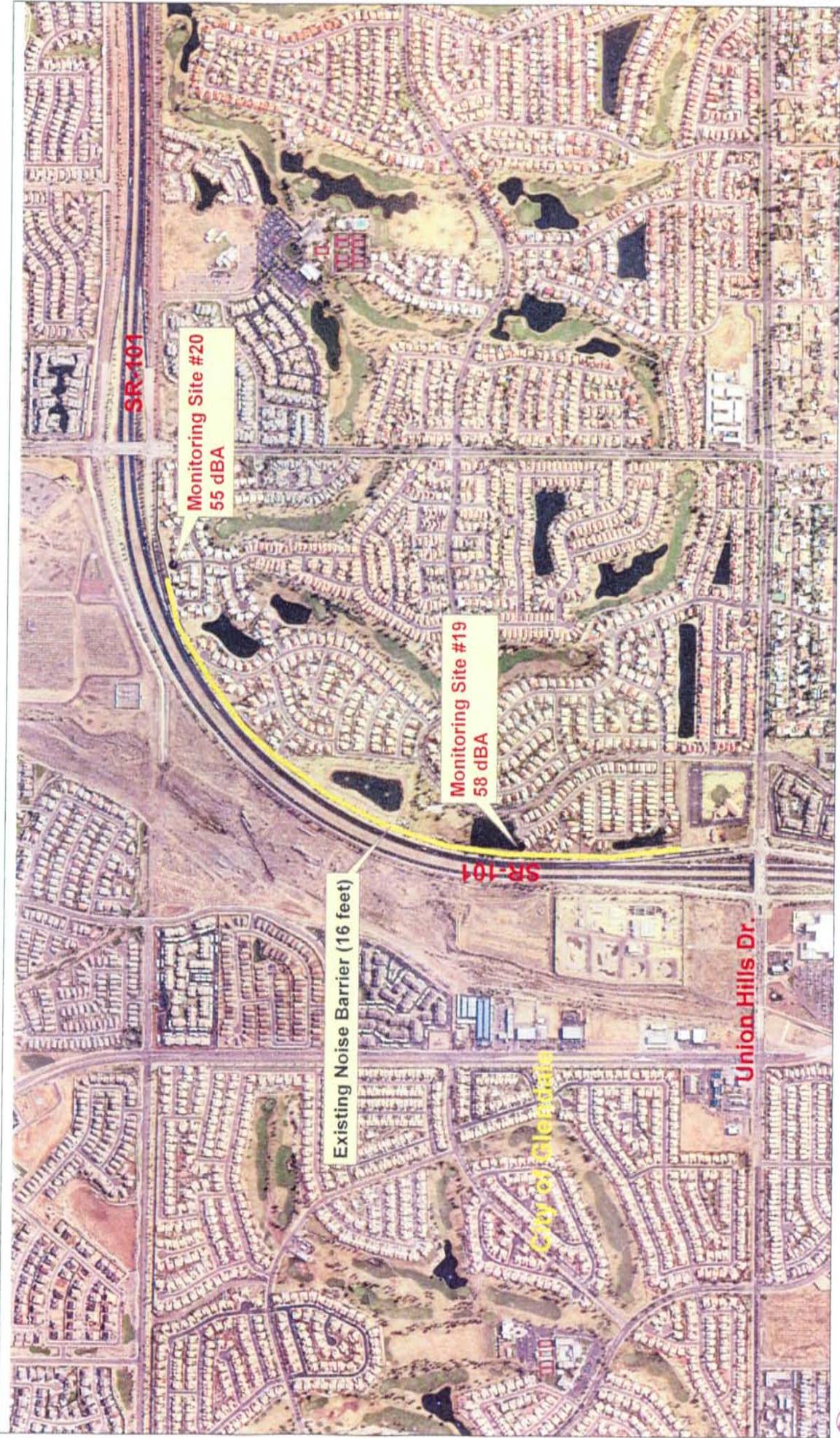




Statewide Noise Monitoring, August 2007  
 Aerial Photo Date, 2004

Monitoring Location: City of Scottsdale, SR 101 and Cactus Road (NWC)

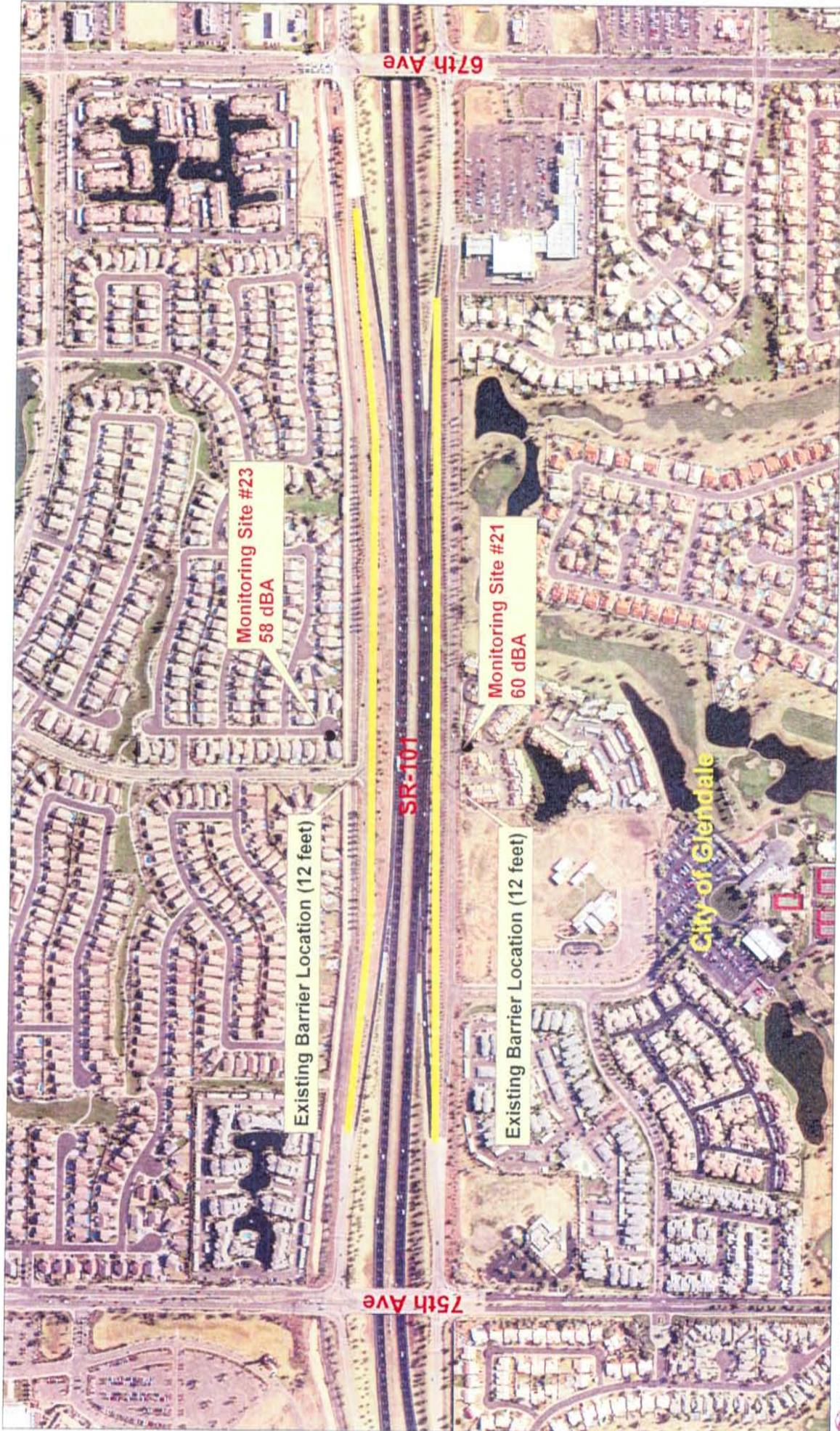




Statewide Noise Monitoring, August 2007  
 Aerial Photo Date, 2004

Monitoring Location: City of Glendale, SR 101, East/South Side from Union Hills Drive to 75th Ave.

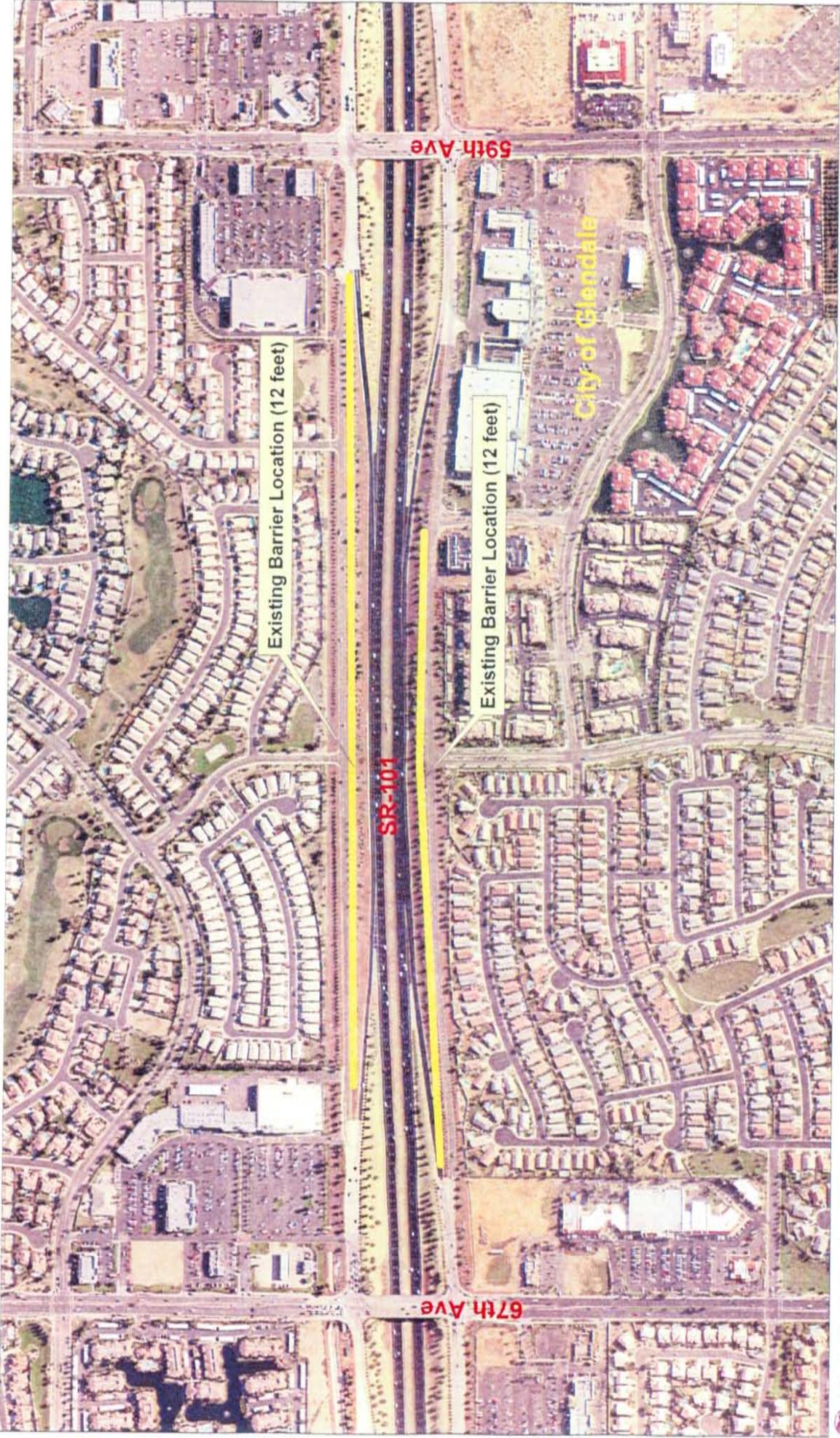




Statewide Noise Monitoring, August 2007  
Aerial Photo Date, 2004

Monitoring Location: City of Glendale, SR 101, Both Sides from 67th Ave. to 75th Ave.





Statewide Noise Monitoring, August 2007  
Aerial Photo Date, 2004

Monitoring Location: City of Glendale, SR 101, Both Sides from 59th Ave. to 67th Ave.

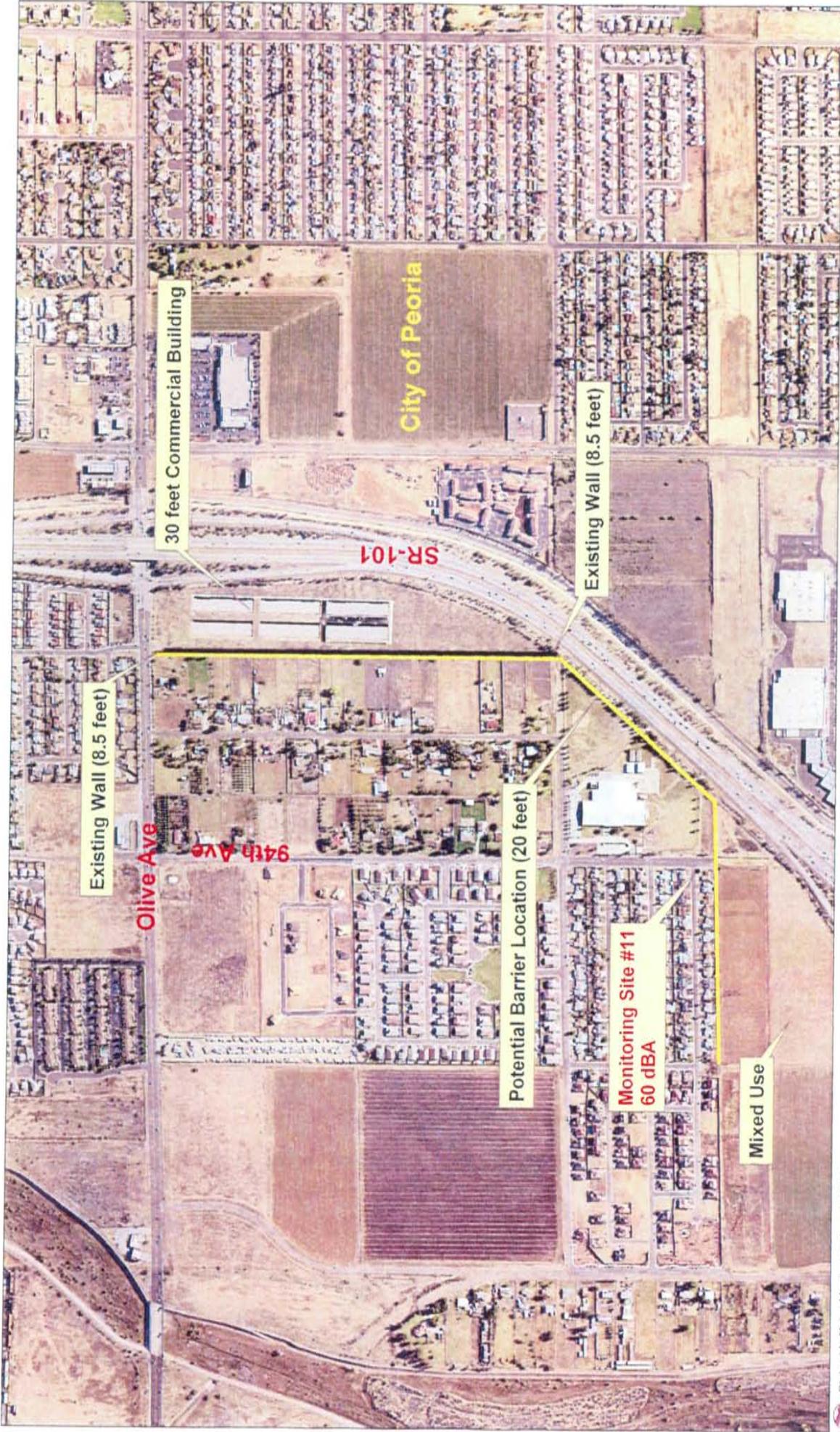




Statewide Noise Monitoring, August 2007  
AECI Aerial Photo Date, 2004

Monitoring Location: City of Glendale, SR 101, South Side of 51st Ave. to 59th Ave.





Stalwilde Noise Monitoring, August 2007  
 Aerial Photo Date, 2004

Monitoring Location: City of Peoria, SR 101, Northern Ave. to Olive Ave.

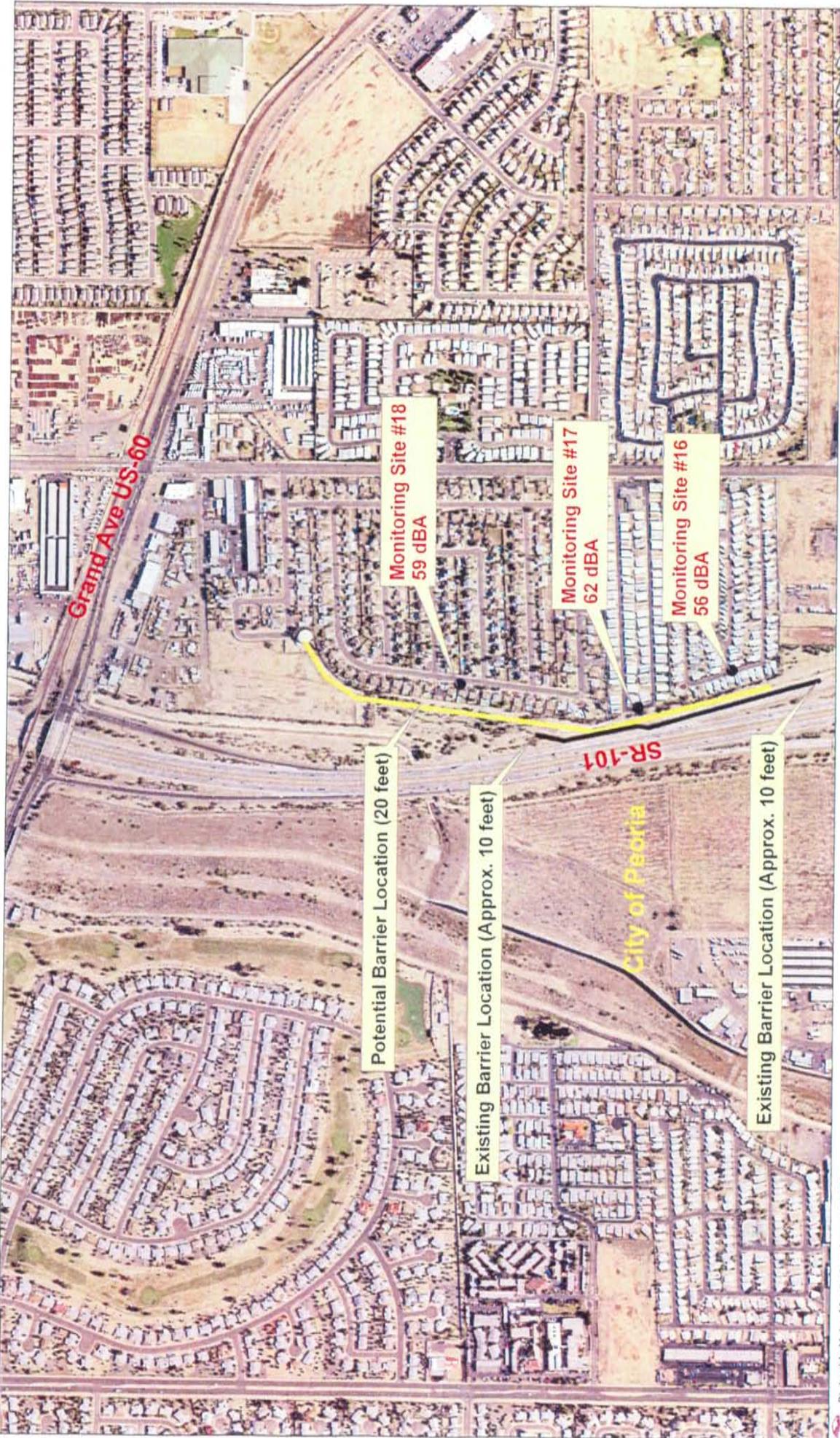




Statewide Noise Monitoring, August 2007  
Aerial Photo Date, 2004

Monitoring Location: City of Peoria, SR 101, Olive Ave. to Peoria Ave.





Statewide Noise Monitoring, August, 2007  
 Aerial Photo Date, 2004

Monitoring Location: City of Peoria, SR 101, Peoria Ave. to Grand Ave.



Monitoring Site #26  
56 dBA

Robertson Drive

Potential Barrier Location (14 feet)

Deer Valley Dr

SR-303

Maricopa County



Statewide Noise Monitoring, August 2007  
Aerial Photo Date, 2004

Monitoring Location: Sun City West, Deer Valley Road to North of Robertson Drive

**APPENDIX B**

**Noise Level Monitoring Results**



4561 E McDowell Road  
 Phoenix, AZ 85008  
 Tel: (602) 454-0402  
 Fax: (602) 458-7465

## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 08/16/2007

Site Number/Description: Monitor #1,

Microphone @ 5 feet above ground, NWC, 9<sup>th</sup> Avenue and Moreland Street

(Prepared by)/Crew: David Shu and Brianan Bullock

Temperature: 90 °F Relative Humidity: 38 % Wind & Direction: From E 4 mph Sky: Sunny

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.2+) ± dB

Posted Speed Limit (mph): 55  
 Observed Speed (mph): 50-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	7:00 AM	10 mins	56.3	59.3	70.6	N/A	N/A	N/A
2	7:10 AM	10 mins	56.3	59.1	64.7	N/A	N/A	N/A

NOTES:

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## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 08/16/2007

Site Number/Description: Monitor #2,

Microphone @ 5 feet above ground, NWC, 11<sup>th</sup> Avenue and Moreland Street

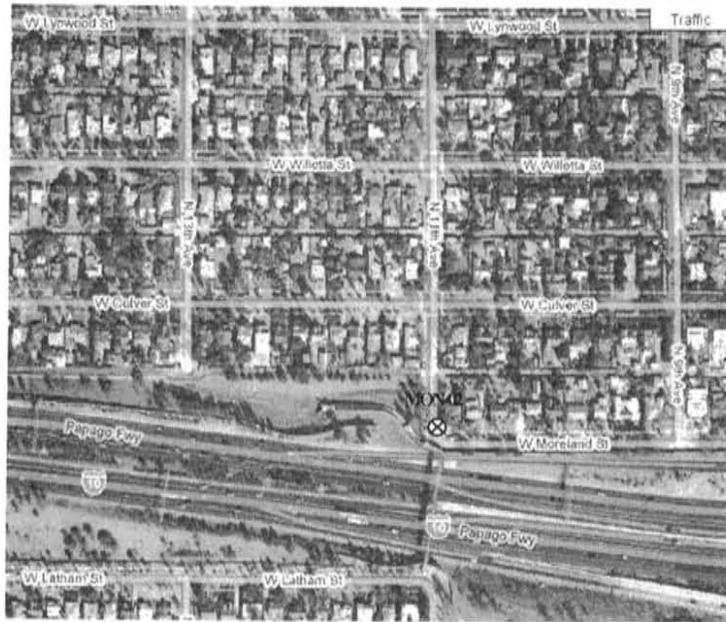
(Prepared by)/Crew: David Shu and Brianan Bullock

Temperature: 90 °F Relative Humidity: 38 % Wind & Direction: From E 4 mph Sky: Sunny

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.2+) ± dB

Posted Speed Limit (mph): 55  
 Observed Speed (mph): 50-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	7:30 AM	10 mins	57.1	60.4	67.0	N/A	N/A	N/A
2	7:40 AM	10 mins	56.6	60.7	66.5	N/A	N/A	N/A

NOTES:

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## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 08/16/2007

Site Number/Description: Monitor #3,

Microphone @ 5 feet above ground, NWC, 13<sup>th</sup> Avenue just south of Culver Street

(Prepared by)/Crew: David Shu and Brianan Bullock

Temperature: 92 F Relative Humidity: 35 % Wind & Direction: From ESE 4 mph Sky: Sunny

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.2+) ± dB

Posted Speed Limit (mph): 55  
 Observed Speed (mph): 50-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	8:00 AM	10 mins	57.3	63.8	69.2	N/A	N/A	N/A
2	8:10 AM	10 mins	55.9	60.2	65.3	N/A	N/A	N/A

NOTES:

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## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 08/16/2007

Site Number/Description: Monitor #4,

Microphone @ 5 feet above ground, SWC, End of the cul-de-sac at E San Rafael Drive

(Prepared by)/Crew: David Shu and Brianan Bullock

Temperature: 95 F Relative Humidity: 31 % Wind & Direction: From SE 5 mph Sky: Sunny

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.2+) ± dB

Posted Speed Limit (mph): 65  
Observed Speed (mph): 60-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	9:05 AM	10 mins	53.0	57.6	62.4	N/A	N/A	N/A
2	9:15 AM	10 mins	53.8	57.4	62.5	N/A	N/A	N/A

NOTES:

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## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 08/16/2007

Site Number/Description: Monitor #5,

Microphone @ 5 feet above ground, West side of freeway just south of East Via Linda

(Prepared by)/Crew: David Shu and Brianan Bullock

Temperature: 97 F Relative Humidity: 28 % Wind & Direction: From SE 5 mph Sky: Sunny

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.2+) ± dB

Posted  
Speed Limit  
(mph): 65

Observed  
Speed  
(mph): 60-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	9:40 AM	10 mins	55.5	59.0	64.7	N/A	N/A	N/A
2	9:50 AM	10 mins	55.0	58.9	70.0	N/A	N/A	N/A

NOTES:

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## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 08/16/2007

Site Number/Description: Monitor #6,

Microphone @ 5 feet above ground, SWC, Larkspur Drive and 87<sup>th</sup> Street

(Prepared by)/Crew: David Shu and Brianan Bullock

Temperature: 99 F Relative Humidity: 26 % Wind & Direction: From SE 5 mph Sky: Sunny

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.2+) ± dB

Posted Speed Limit (mph): 65  
 Observed Speed (mph): 60-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	10:15 AM	10 mins	52.2	57.6	72.5	N/A	N/A	N/A
2	10:25 AM	10 mins	53.1	58.4	66.7	N/A	N/A	N/A

NOTES:

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## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 08/16/2007

Site Number/Description: Monitor #7,

Microphone @ 5 feet above ground, SWC, Sweetwater Avenue and 87<sup>th</sup> Street

(Prepared by)/Crew: David Shu and Brianan Bullock

Temperature: 100 F Relative Humidity: 25 % Wind & Direction: From SSE 5 mph Sky: Sunny

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.2+) ± dB

Posted Speed Limit (mph): 65  
 Observed Speed (mph): 60-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	10:40 AM	10 mins	47.2	53.1	64.3	N/A	N/A	N/A
2	10:50 AM	10 mins	48.0	53.3	64.1	N/A	N/A	N/A

NOTES:

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## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 08/16/2007

Site Number/Description: Monitor #8,

Microphone @ 5 feet above ground, NWC, East Waltann Lane and 35<sup>th</sup> Street

(Prepared by)/Crew: David Shu and Brianan Bullock

Temperature: 104.3F Relative Humidity: 21 % Wind & Direction: From S 5 mph Sky: Sunny

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.2+) ± dB

Posted Speed Limit (mph): 65 Observed Speed (mph): 60-65

Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	12:15 PM	10 mins	49.9	55.2	60.3	N/A	N/A	N/A
2	12:25 PM	10 mins	51.7	56.9	70.9	N/A	N/A	N/A

NOTES:

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## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 08/16/2007

Site Number/Description: Monitor #9,

Microphone @ 5 feet above ground, SWC, North 10<sup>th</sup> Place and East Pontiac Drive

(Prepared by)/Crew: David Shu and Brianan Bullock

Temperature: 105.5F Relative Humidity: 20 % Wind & Direction: From SSW 5 mph Sky: Mostly Sunny

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.2+) ± dB

Posted Speed Limit (mph): 65  
 Observed Speed (mph): 60-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	1:10 PM	10 mins	55.5	61.8	71.7	N/A	N/A	N/A
2	1:20 PM	10 mins	55.2	61.3	69.9	N/A	N/A	N/A

NOTES:

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## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 08/16/2007

Site Number/Description: Monitor #10,

Microphone @ 5 feet above ground, NE of West Highland Avenue and Black Canyon Highway frontage Road

(Prepared by)/Crew: David Shu and Brianan Bullock

Temperature: 107F Relative Humidity: 18 % Wind & Direction: From SSW 4 mph Sky: Mostly Sunny

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.2+) ± dB

Posted Speed Limit (mph): 55  
 Observed Speed (mph): 50-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	2:00 PM	10 mins	61.3	67.4	90.9	N/A	N/A	N/A
2	2:10 PM	10 mins	60.6	64.4	69.2	N/A	N/A	N/A

NOTES:

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## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 08/22/2007

Site Number/Description: Monitor #11,

Microphone @ 5 feet above ground, Northwest of North 95<sup>th</sup> Avenue and West Las Palmaritas Drive

(Prepared by)/Crew: David Shu and Brianan Bullock

Temperature: 106F Relative Humidity: 20 % Wind & Direction: From W 8 mph Sky: Sunny

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.1+) ± dB

Posted Speed Limit (mph): 65  
 Observed Speed (mph): 60-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	2:25 PM	10 mins	54.2	60.2	70.9	N/A	N/A	N/A
2	2:35 PM	10 mins	53.2	60.4	67.5	N/A	N/A	N/A

NOTES:

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## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 08/22/2007  
 Site Number/Description: Monitor #12,  
Microphone @ 5 feet above ground, SW of North 92<sup>nd</sup> Drive and West Sanna Circle  
 (Prepared by)/Crew: David Shu and Brianan Bullock  
 Temperature: 88 F Relative Humidity: 45 % Wind & Direction: From NW 5 mph Sky: Sunny  
 SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB  
 Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.1+) ± dB

Posted Speed Limit (mph): 65  
 Observed Speed (mph): 60-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	7:30 AM	20 mins	53.4	59.2	65.1	N/A	N/A	N/A

NOTES:

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## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 08/22/2007

Site Number/Description: Monitor #13,

Microphone @ 5 feet above ground, SW of North 92<sup>nd</sup> Drive and West Mountain View Road

(Prepared by)/Crew: David Shu and Brianan Bullock

Temperature: 89 F Relative Humidity: 43 % Wind & Direction: From NW 5 mph Sky: Sunny

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.1+) ± dB

Posted Speed Limit (mph): 65  
 Observed Speed (mph): 60-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	7:55 AM	10 mins	56.8	62.5	72.1	N/A	N/A	N/A
2	8:05 AM	10 mins	56.7	61.5	71.8	N/A	N/A	N/A

NOTES:

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## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 08/22/2007

Site Number/Description: Monitor #14,

Microphone @ 5 feet above ground, NW of West Mountain View Road between 92<sup>nd</sup> Drive and 94<sup>th</sup> Avenue

(Prepared by)/Crew: David Shu and Brianan Bullock

Temperature: 90.5 F Relative Humidity: 40 % Wind & Direction: From NW 5 mph Sky: Sunny

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.1+) ± dB

Posted Speed Limit (mph): 65  
 Observed Speed (mph): 60-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	8:20 AM	10 mins	38.6	51.5	73.0	N/A	N/A	N/A
2	8:30 AM	10 mins	39.9	48.6	67.3	N/A	N/A	N/A

NOTES:

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## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 08/22/2007

Site Number/Description: Monitor #15,

Microphone @ 5 feet above ground, NW of 92<sup>nd</sup> Drive and West Monroe Street

(Prepared by)/Crew: David Shu and Brianan Bullock

Temperature: 92 F Relative Humidity: 38 % Wind & Direction: From NW 6 mph Sky: Sunny

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.1+) ± dB

Posted Speed Limit (mph): 65  
 Observed Speed (mph): 60-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	8:50 AM	10 mins	55.7	62.1	68.2	N/A	N/A	N/A
2	9:00 AM	10 mins	51.8	60.3	65.9	N/A	N/A	N/A

NOTES:

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## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 08/22/2007

Site Number/Description: Monitor #16,

Microphone @ 5 feet above ground, Behind the first row in the Mobile Home Park

(Prepared by)/Crew: David Shu and Brianan Bullock

Temperature: 94 F Relative Humidity: 35 % Wind & Direction: From NW 6 mph Sky: Sunny

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.1+) ± dB

Posted Speed Limit (mph): 65  
 Observed Speed (mph): 60-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	9:20 AM	10 mins	48.5	58.3	70.1	N/A	N/A	N/A
2	9:30 AM	10 mins	48.3	54.8	63.2	N/A	N/A	N/A

NOTES:

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## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 08/22/2007

Site Number/Description: Monitor #17,

Microphone @ 5 feet above ground, In front of the first row in the Mobile Home Park

(Prepared by)/Crew: David Shu and Brianan Bullock

Temperature: 95 F Relative Humidity: 33 % Wind & Direction: From W 6 mph Sky: Sunny

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.1+) ± dB

Posted Speed Limit (mph): 65  
 Observed Speed (mph): 60-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	9:45 AM	10 mins	57.8	61.6	66.9	N/A	N/A	N/A
2	9:55 AM	10 mins	57.0	61.9	66.4	N/A	N/A	N/A

NOTES:

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## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 08/22/2007

Site Number/Description: Monitor #18,

Microphone @ 5 feet above ground, SW of West Yucca Street and North 93rd Avenue

(Prepared by)/Crew: David Shu and Brianan Bullock

Temperature: 96.5 F Relative Humidity: 31 % Wind & Direction: From W 6 mph Sky: Sunny

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.1+) ± dB

Posted Speed Limit (mph): 65  
 Observed Speed (mph): 60-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	10:20 AM	10 mins	52.5	55.4	63.3	N/A	N/A	N/A
2	10:30 AM	10 mins	52.5	61.4	66.3	N/A	N/A	N/A

NOTES:

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## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 08/22/2007

Site Number/Description: Monitor # 20,

Microphone @ 5 feet above ground, NE of North 77<sup>th</sup> Avenue and West Escuda Road

(Prepared by)/Crew: David Shu and Brianan Bullock

Temperature: 99.5 F Relative Humidity: 27 % Wind & Direction: From W 6 mph Sky: Sunny

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.1+) ± dB

Posted Speed Limit (mph): 65  
Observed Speed (mph): 60-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	11:30 AM	10 mins	50.4	55.0	62.1	N/A	N/A	N/A
2	11:40 AM	10 mins	49.5	55.0	65.7	N/A	N/A	N/A

NOTES:

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## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 08/22/2007

Site Number/Description: Monitor # 21,

Microphone @ 5 feet above ground, SE of West Beardsley Road and Arrowhead Lakes Condominiums

(Prepared by)/Crew: David Shu and Brianan Bullock

Temperature: 102 F Relative Humidity: 23 % Wind & Direction: From WSW 7 mph Sky: Sunny

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.1+) ± dB

Posted Speed Limit (mph): 65  
 Observed Speed (mph): 60-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	12:40 PM	10 mins	50.4	59.6	71.6	N/A	N/A	N/A
2	12:50 PM	10 mins	50.1	60.3	71.3	N/A	N/A	N/A

NOTES:

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4561 E McDowell Road  
 Phoenix, AZ 85008  
 Tel: (602) 454-0402  
 Fax: (602) 458-7465

## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 08/22/2007

Site Number/Description: Monitor # 22,

Microphone @ 5 feet above ground, SW of North 53rd Avenue and West Escuda Road

(Prepared by)/Crew: David Shu and Brianan Bullock

Temperature: 104 F Relative Humidity: 22 % Wind & Direction: From W 7 mph Sky: Sunny

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.1+) ± dB

Posted Speed Limit (mph): 65  
 Observed Speed (mph): 60-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	1:10 PM	10 mins	52.8	58.1	70.3	N/A	N/A	N/A
2	1:20 PM	10 mins	51.6	56.9	68.8	N/A	N/A	N/A

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# ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 08/22/2007

Site Number/Description: Monitor # 23,

Microphone @ 5 feet above ground, SW of North 70<sup>th</sup> Drive and Cul-de-sac

(Prepared by)/Crew: David Shu and Brianan Bullock

Temperature: 106 F Relative Humidity: 19 % Wind & Direction: From W 8 mph Sky: Sunny

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.1+) ± dB

Posted Speed Limit (mph): 65  
 Observed Speed (mph): 60-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	1:45 PM	10 mins	51.2	58.0	65.2	N/A	N/A	N/A
2	1:55 PM	10 mins	53.0	58.8	73.6	N/A	N/A	N/A

NOTES:

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## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 06/05/2007

Site Number/Description: Monitor # 24,

Microphone @ 5 feet above ground, playground, SEC, West Menadota Drive and North 48<sup>th</sup> Lane

(Prepared by)/Crew: Chet Monh and David Shu

Temperature: 80 F Relative Humidity: 15-20 % Wind & Direction: 0-5 mph Sky: Cloudy

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.1+) ± dB

Posted Speed Limit (mph): 65  
Observed Speed (mph): 60-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	6:02 AM	10 mins	54.8	58.2	62.3	N/A	N/A	N/A
2	6:12 AM	10 mins	55.0	58.2	62.9	N/A	N/A	N/A
3	6:22 AM	10 mins	55.0	58.0	62.7	N/A	N/A	N/A

NOTES:

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## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 06/05/2007

Site Number/Description: Monitor # 25,

Microphone @ 5 feet above ground, 4762 West Menadota Drive (Backyard)

(Prepared by)/Crew: Chet Monh and David Shu

Temperature: 80 F Relative Humidity: 15-20 % Wind & Direction: 0-5 mph Sky: Cloudy

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0.1+) ± dB

Posted Speed Limit (mph): 65  
Observed Speed (mph): 60-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	6:35 AM	10 mins	55.6	61.4	68.3	N/A	N/A	N/A
2	6:45 AM	10 mins	54.9	60.5	70.7	N/A	N/A	N/A
3	6:55 AM	10 mins	54.9	60.8	72.3	N/A	N/A	N/A

NOTES:

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## ROADWAY TRAFFIC NOISE LEVEL MEASUREMENT DATA SHEET

Project Number/Name: 06001-05, STATEWIDE NOISE MONITORING Date: 04/23/2007

Site Number/Description: Monitor # 26,

Microphone @ 5 feet above ground, 15435 West Robertson Drive

(Prepared by)/Crew: Chet Monh and David Shu

Temperature: 58-68 F Relative Humidity: 30-50 % Wind & Direction: 0-5 mph Sky: Clear

SLM Make/Model: LDL 824 Calibration Make/Model: LDL CA 200 @ 114 DB

Response/Weighting: Slow response, A Weighted Cal. Start: (0) ± dB Cal. End: (0) ± dB

Posted Speed Limit (mph): 65  
 Observed Speed (mph): 60-65



Sample	Time		Sound Level, dBA			Traffic Count		
	Start	Duration	L <sub>MIN</sub>	L <sub>EQ</sub>	L <sub>MAX</sub>	Auto	Med. Trk.	Hvy. Trk.
1	6:57 AM	10 mins	49.3	55.5	62.0	N/A	N/A	N/A
2	7:07 AM	10 mins	50.7	57.1	69.3	N/A	N/A	N/A
3	7:17 AM	10 mins	48.0	54.3	62.5	N/A	N/A	N/A

NOTES:

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**APPENDIX C**

**Monitoring Site Photos**



Site #1 Looking South (Existing Barrier, 9-10 feet Customer Side)



Site #1 Looking West



Site #2 Look South (Existing Barrier, 9-10 feet Customer Side)



Site #2 Looking East



Site #2 Existing Barrier, Looking East



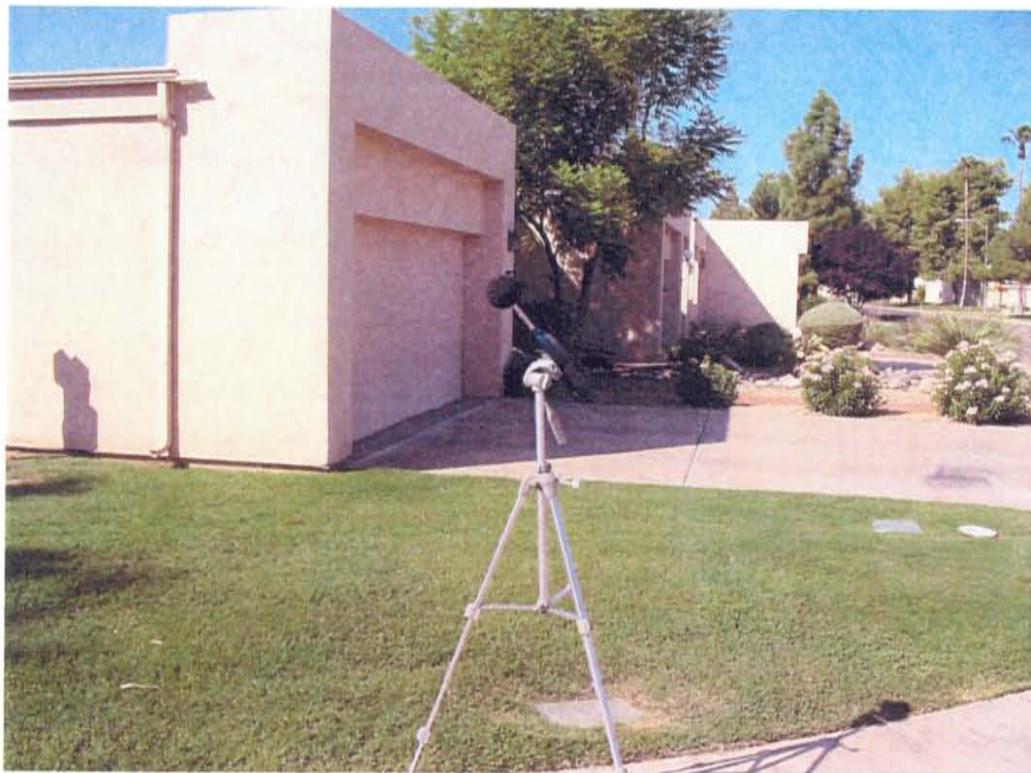
Site #3 Looking South (Existing Barrier, 9-10 feet Customer Side)



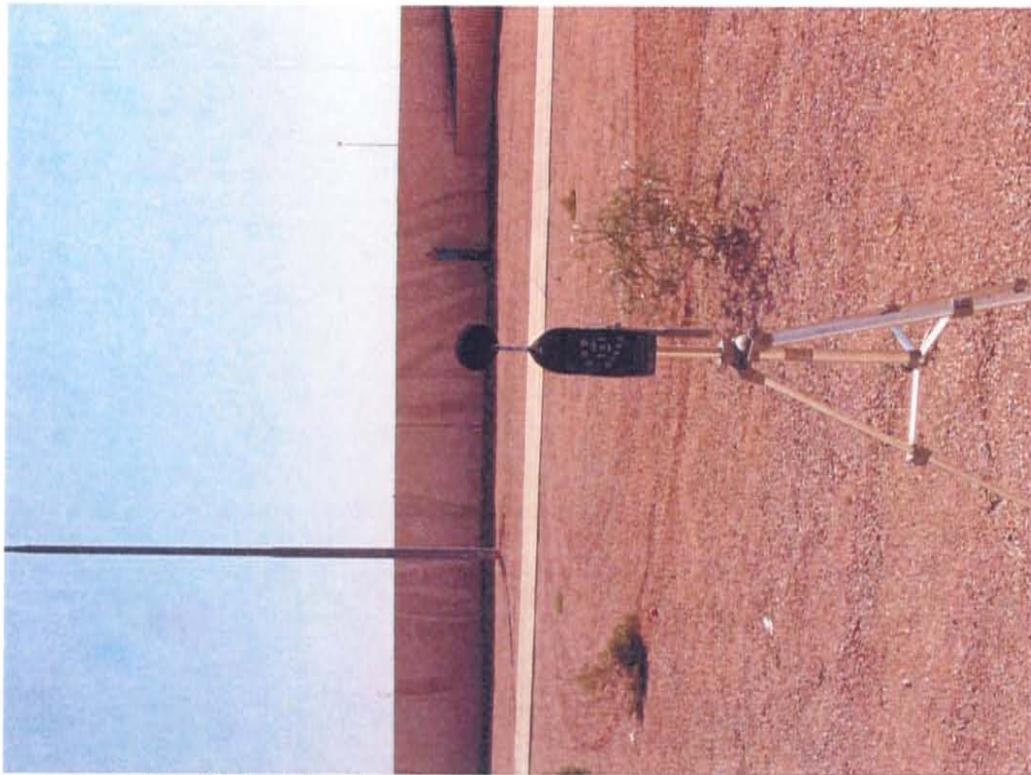
Site #3 Looking West



Site #4 Looking East (Privacy Wall behind Existing Barrier of 9 feet)



Site #4 Looking South



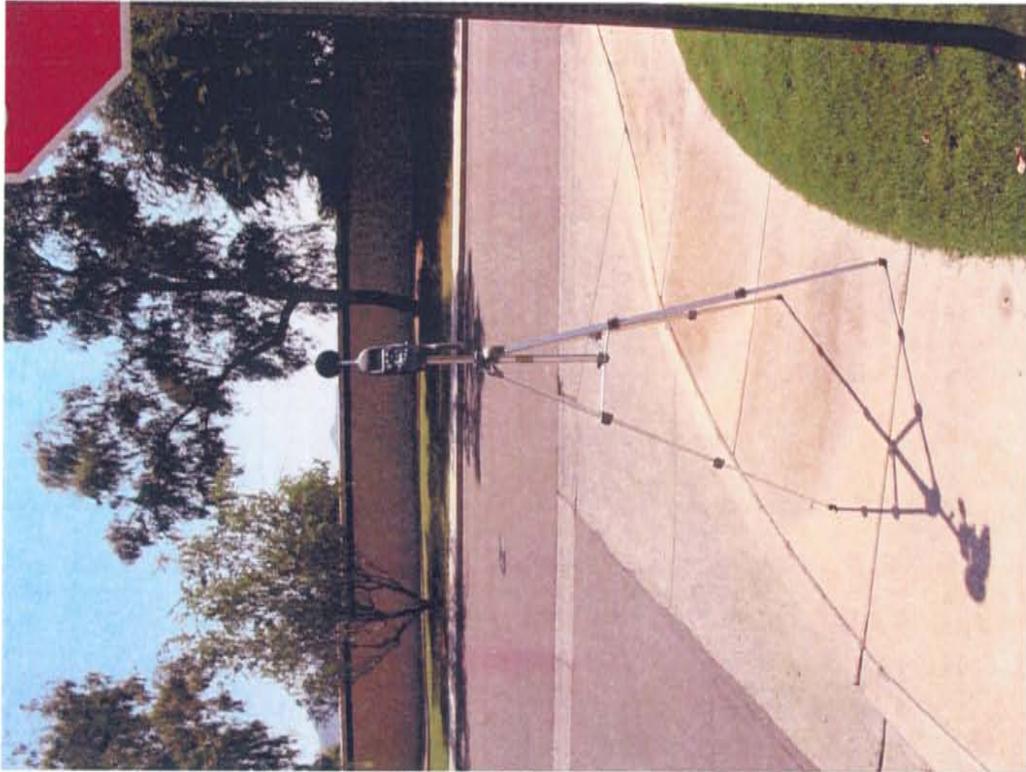
Site #5 Looking East (Existing Barrier, 9 feet Customer Side)



Site #5 Looking North



Site #5 Barrier Location, Looking North



Site #6 Looking East (Existing Privacy Wall, 7.5 feet)



Site #6 Looking South



Site #7 Looking East



Site #7 Looking South



Site #7 Existing Barrier Location, Looking North (11 feet)



Site #8 Looking East



Site #8 Looking North



Site #8 Berm Location, Looking North



Site #9 Looking West



Site #9 Looking East (Existing Privacy Wall, 7.5 feet)



Site #10 Looking West



Site #10 Looking North



Site #11 Looking South East



Site #11 Looking West



Site #11 Existing Wall South of Olive Ave (8.5 feet)



Site #11 30 feet Commercial Building South of Olive Ave



Site #12 Looking East (Privacy Wall, 8 feet)



Site #12 Looking South



Site #13 Looking East (Privacy Wall, 8 feet)



Site #13 Looking West



Site #14 Looking East



Site #14 Looking West



Site #15 Looking East (Privacy Wall, 8 feet)



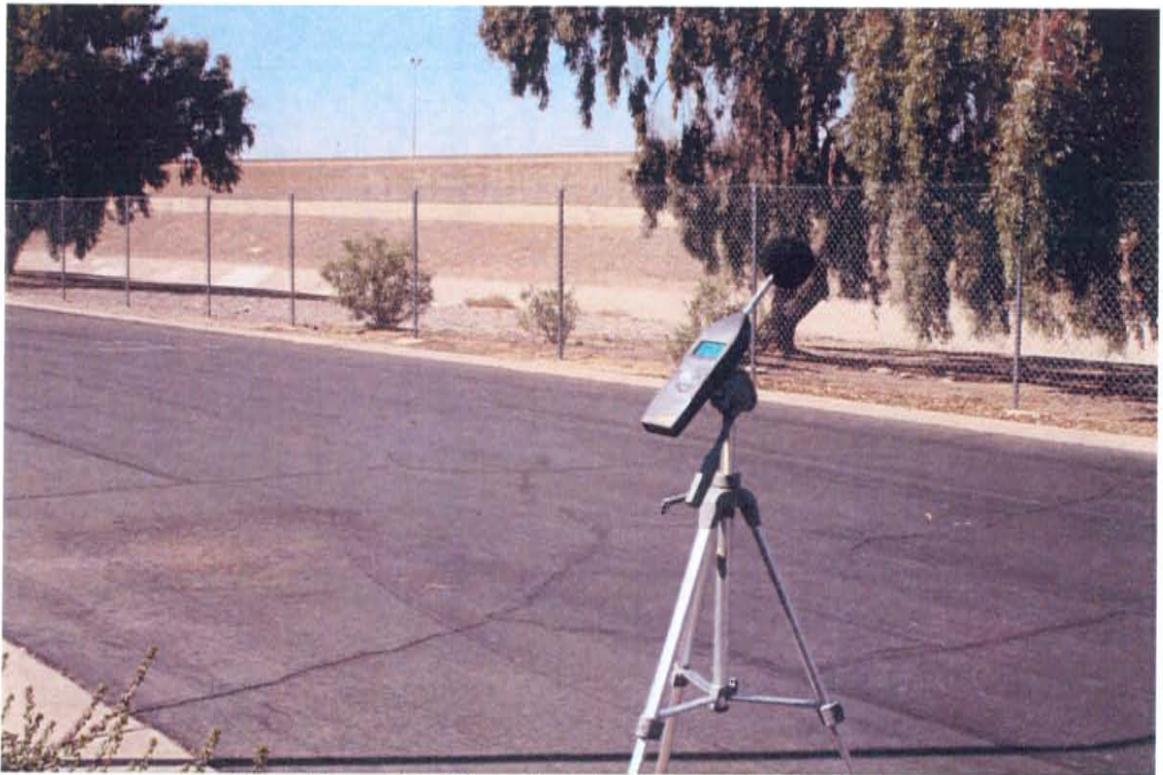
Site #15 Looking West



Site #16 Looking West (Existing Barrier, Appro. 10 feet)



Site #16 Looking North



Site #17 Looking West (Existing Barrier, Appro. 10 feet)



Site #17 Looking North



Site #18 Looking West



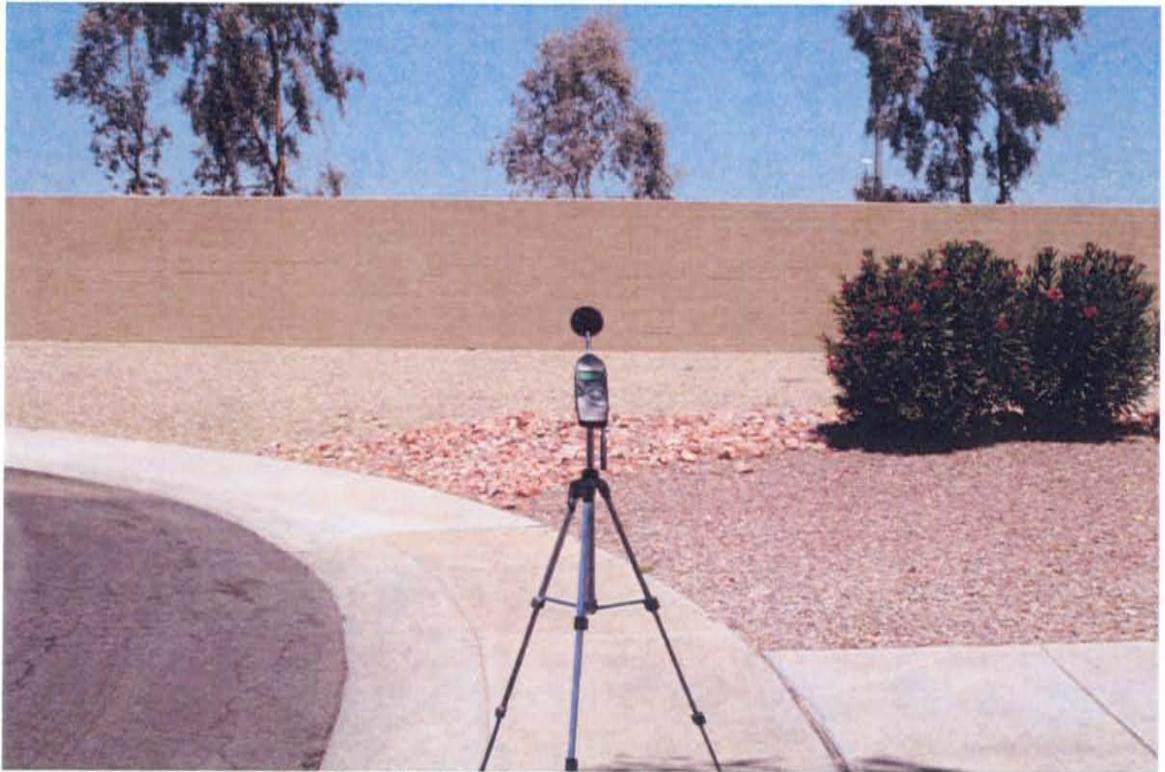
Site #18 Looking South



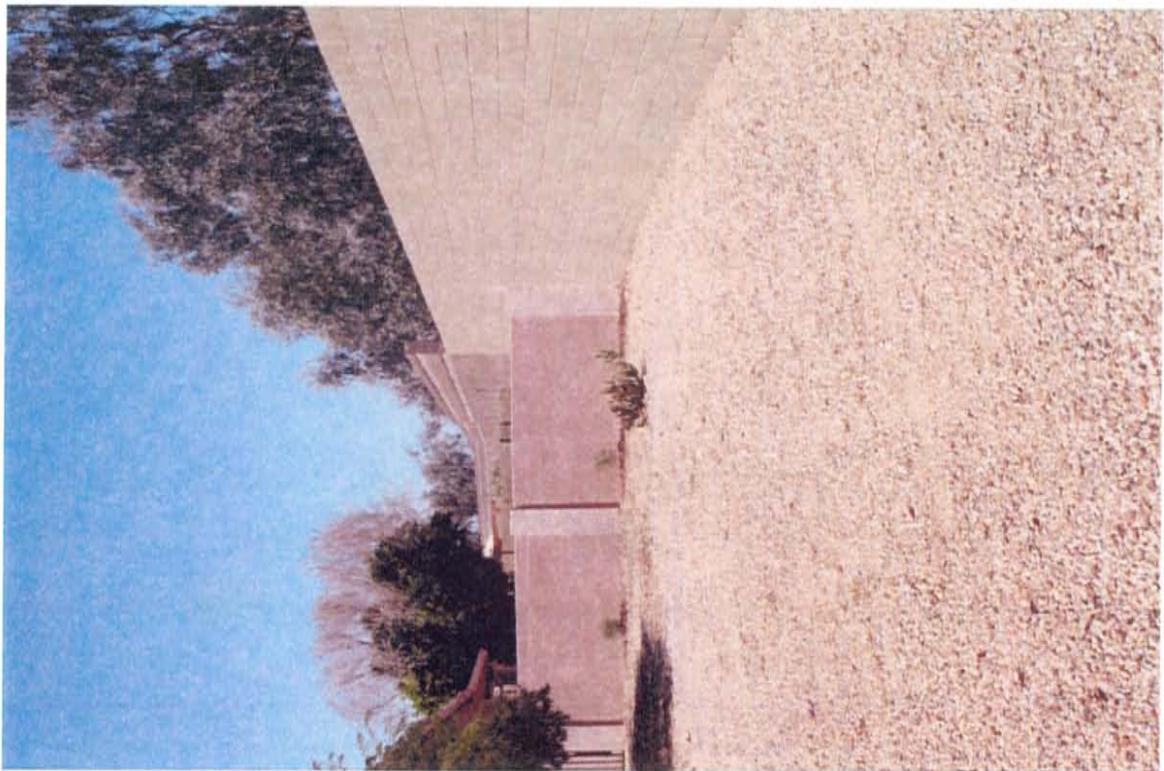
Site #19 Looking West (Existing Barrier, Appro. 16 feet)



Site #19 Looking North



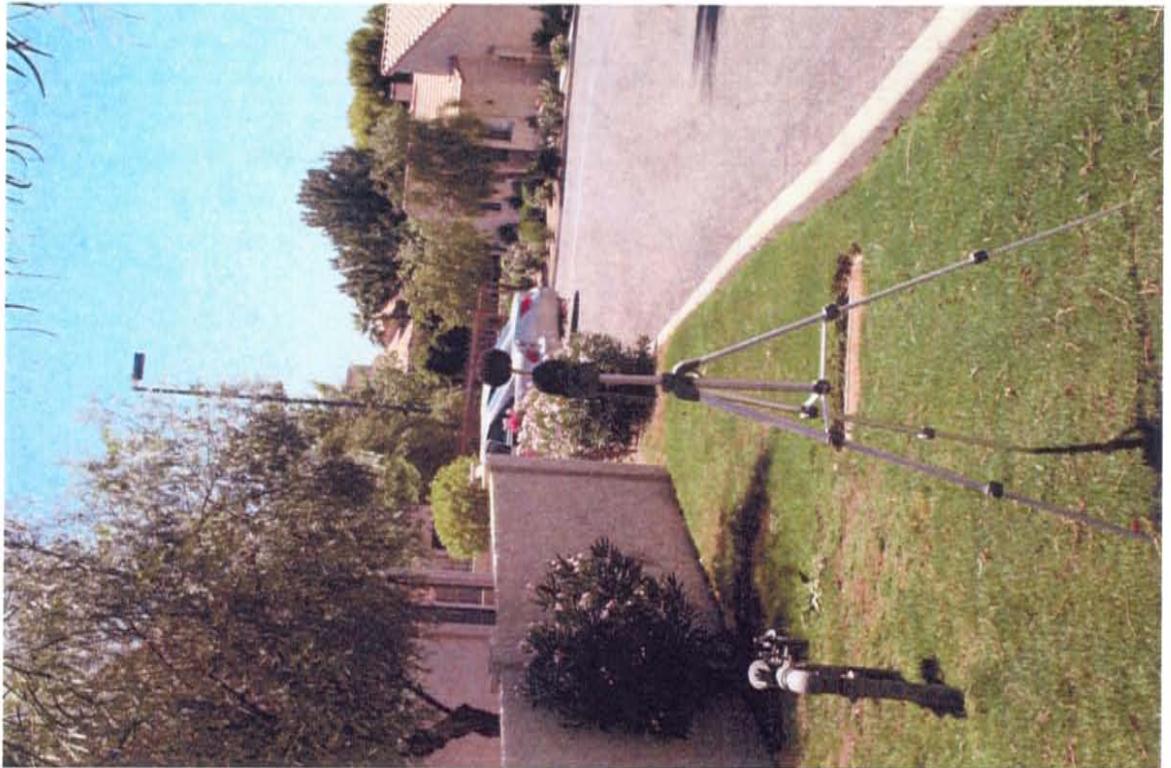
Site #20 Looking North (Existing Barrier, Appro. 12 feet)



Site #20 Looking West (End of Existing Barrier, 16 feet)



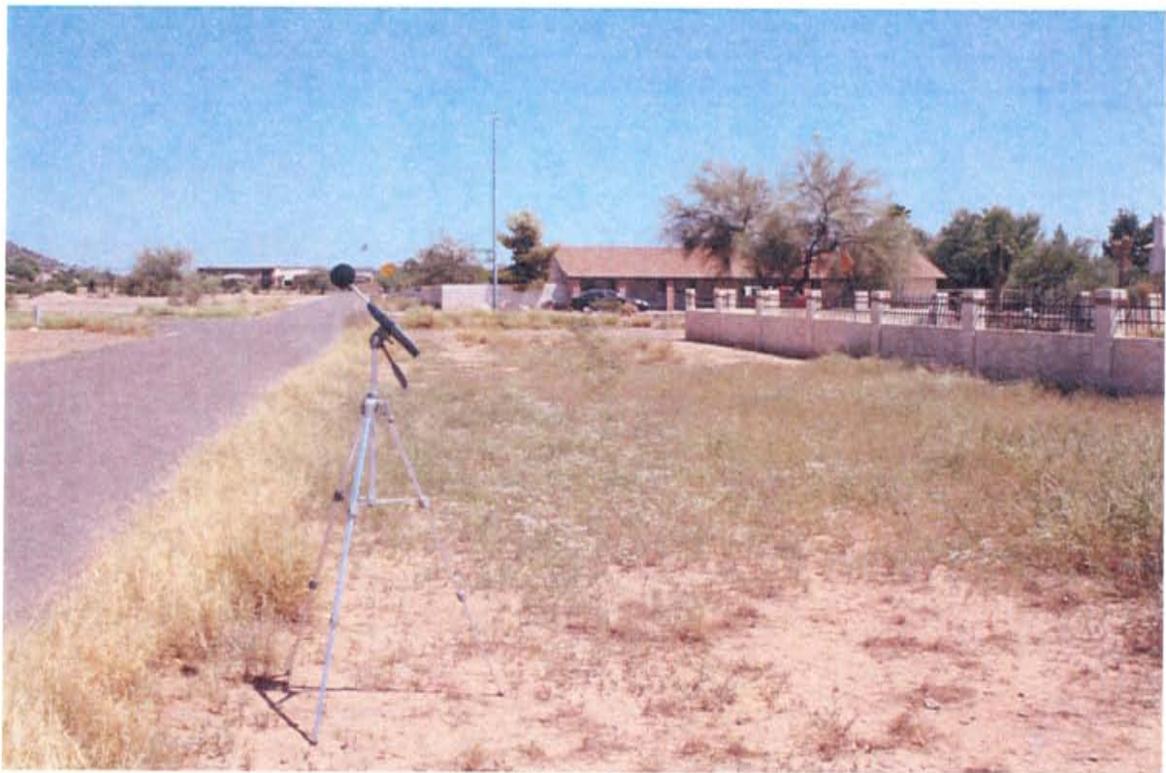
Site #21 Looking North (Existing Barrier, 12 feet)



Site #21 Looking South



Site #22 Looking North (Existing Barrier, 12 feet)



Site #22 Looking East



Site #23 Looking South (6 feet Privacy Wall behind 12 feet Existing Barrier)



Site #23 Looking East

## **APPENDIX D**

### **Noise Reduction Priority Matrix**

**TABLE 1**  
**PRIORITY OF NOISE REDUCTION CONSIDERATIONS BY JURISDICTION**

<b>Jurisdictions</b>	<b>Area Location</b>	<b>Priority Index *</b>
City of Phoenix	I-17 & Camelback Road, Southeast Quadrant	1
	I-10, 7th Avenue to 15th Avenue (North of Interstate)	2
	SR 101L & 51st Avenue, Southeast Quadrant	3
	SR 101L & 7th Street, Northeast Quadrant	4
	SR 51 & Greenway Parkway, Northwest Quadrant	5
City of Scottsdale	SR 101L & 90th Street, Northwest Quadrant	1
	SR 101L & Cactus Road, Northwest Quadrant	2
City of Peoria	SR 101L, Peoria Avenue to Grand Avenue	1
	SR 101L, Olive Avenue to Peoria Avenue	2
	SR 101L, North Avenue to Olive Avenue	3
Maricopa County	SR 303L, Deer Valley Road to North of Robertson Drive	1

\* 1 being the highest priority and 5 being the least priority

**TABLE 2  
SUGGESTED PRIORITIZATION OF  
NOISE REDUCTION CONSIDERATION**

	1	2	3	4
<b>Suggested Priority</b>				
<b>Neighborhood Information</b>				
City	Phoenix	Phoenix	Phoenix	Phoenix
Location	I-17 & Camelback Road, SE Quadrant	1-10 between 7th Avenue to 15th Avenue, North side of the Interstate	SR 101L & 51st Avenue, Southeast Quadrant	SR 101 & 7th Street, NE Quadrant
Date of Neighborhood	Permitted 3/12/1996	Constructed 1920-1940	Constructed 1985	Constructed 1999
Type of Neighborhood	Apartments/Condominiums	Single Family Home	Single Family Homes	Single Family Home
Approximate Distance of First Row Homes From Roadway	280 ft	300 ft	220 ft	250 feet
Existing Privacy Wall?	None	None	Yes, 8 feet high	Yes, 8 feet
Existing Soundwall?	None	Yes, on retaining wall, 9-10 feet on customer side	None	None
<b>Existing Roadway and Noise Condition</b>				
Route Name/No.	I-17	I-10	SR 101L	SR 101
Date of Public Knowledge	2/27/1957	5/8/1965	2/9/1984	5/11/1995
Existing Lanes Configuration	3 GPLs & 1 HOV each travel direction	5 GPLs in each travel direction	3 GPLs in each travel direction	3 GPLs in each travel direction
Existing Traffic Volume	213,000 AADT (2005)	258,000 AADT (2005)	150,000 AADT (2005)	154,000 AADT (2005)
Asphalt Rubber Friction Course (ARFC); Quiet Pavement Installed?	Yes	Yes	Yes	Yes
Measured Noise Levels Location	Common outdoor area (swimming pool), MON-10, NE of West Highland Avenue and frontage Road	MON-01, NW corner, 9th Avenue and Moreland Street; MON-02, NW corner, 11th Avenue and Moreland Street; MON-03, NW corner of 13th Avenue and south of Culver Street	MON-24, Playground, SE Corner, West Menadota Drive and North 48th Lane; MON-25, 4762 West Menadota Drive (Backyard)	MON-09, SW corner, North 10th Place and East Pontiac Drive
<b>Measured Noise Level, Leq</b>	66 dBA	59 to 62 dBA	58 to 61 dBA	62 dBA
<b>Dominant Measured Noise Source</b>	I-17 Mainline, I-17 Ramps, Frontage Road	I-10 Mainline, Ramp	SR 101L Mainline, Ramp, Frontage Road	SR 101 mainline, ramp and frontage road
<b>Future Freeway Improvement</b>				
Improvement Plan Phase	Phase 3, (FY 2016-2020)	None	Phase 4, (FY 2021-2026)	Phase 2 (FY 2011-2015), Phase 4 (FY 2021-2026)
Future Lanes Configuration	5 GPLs & 1 HOV each travel direction	None	4 GPLs & 1 HOV each travel direction	4 GPLs & 1 HOV each travel direction
Barrier Mitigation Cost *	\$528,000, new barrier approximately 800 feet long and 20 feet high on northbound side	\$1,750,000 (including removal costs for existing noise barrier), new barrier approximately 2,500 feet long and 20 feet high on westbound side	\$896,000 (including removal costs for existing privacy wall), new barrier approximately 1,300 feet long and 20 feet high on eastbound side	\$896,000 (including removal costs for existing privacy wall), new barrier approximately 1,300 feet long and 20 feet high on westbound side
Estimated Cost-Per-Benefitted-Customer **	\$66,000	\$43,750	\$32,000	\$30,897
<b>Comments</b>	There is an existing sound wall between the frontage road and the I-17 to the south of the property.	Roadway is depressed, 20+ feet below grade	Roadway is depressed, below grade	Roadway is depressed, below grade

Notes: \* The barrier mitigation costs are calculated based on city requested locations and heights, with a unit cost of \$33 per square foot. Removal costs for existing barriers and privacy walls are calculated based on \$40 per linear foot.  
 The total mitigation cost for the 11 noise barrier sites is approximately \$17,000,000.  
 \*\* The cost-per-benefitted-customer is calculated based on the assumption that all the customers within 200 feet of the barrier are regarded as benefitted customers.

TABLE 2 Continued  
SUGGESTED PRIORITIZATION OF  
NOISE REDUCTION CONSIDERATION

	5	6	7	8
<b>Suggested Priority</b>				
<b>Neighborhood Information</b>	Peoria	Peoria	Peoria	Scottsdale
City				
Location	SR 101, Peoria Avenue to Grand Avenue	SR 101, Olive Avenue to Peoria Avenue, Southbound Customers	SR 101, North Avenue to Olive Avenue, WN Quadrant	SR 101 & 90th Street, NW Quadrant
Date of Neighborhood	Permitted 1973	Permitted 1987	Permitted 1985	Permitted 1978
Type of Neighborhood	Single Family Home & Mobile Home	Single Family Home	Single Family Home	Single Family Home
Approximate Distance of First Row Homes From Roadway	250-700 feet	200 feet	500-800 feet	200-300 feet
Existing Privacy Wall?	Yes, 8 feet	Yes, 8 feet	Yes, 9 feet	Yes, 5-7 feet
Existing Soundwall?	Yes, approximately 10 feet.	None	None	Yes, approximately 9 feet on the customer side
<b>Existing Roadway and Noise Condition</b>				
Route Name/No.	SR 101	SR 101	SR 101	SR 101
Date of Public Knowledge	6/21/1984	6/21/1984	6/21/1984	7/24/1985
Existing Lanes Configuration	3 GPLs in each travel direction	3 GPLs in each travel direction	3 GPLs in each travel direction	3 GPLs in each travel direction
Existing Traffic Volume	129,000 AADT (2005)	139,000 AADT (2005)	142,000 AADT (2005)	146,000 AADT (2005)
Asphalt Rubber Friction Course (ARFC), Quiet Pavement Installed?	Yes	Yes	Yes	Yes
Measured Noise Levels Location	MON-16, Behind the first row in the Mobile Home Park; MON-17, In front of the first row in the Mobile Home Park; MON-18, SW of West Yucca Street and North 93rd Avenue	MON-12, SW of North 92nd Drive and West Sanna Circle; MON-13, SW of N 92nd Dr and W Mountain View Road between 92nd Drive and 94th Avenue; MON-15, NW of 92nd Drive and West Monroe Street	MON-11, NW of N 95th Avenue and West Las Palmaritas Drive	MON-04, SW corner, End of the cul-de-sac at East San Rafael Drive; MON-05, West side of freeway south of E Via Linda
<b>Measured Noise Level, Leq</b>	56 to 62 dBA	50 to 62 dBA	60 dBA	58 to 59 dBA
<b>Dominant Measured Noise Source</b>	SR 101	SR 101	SR 101	SR 101
<b>Future Freeway Improvement</b>				
Improvement Plan Phase	Phase 3 (FY 2016-2020), Phase 4 (FY 2021-2026)	Phase 3 (FY 2016-2020), Phase 4 (FY 2021-2026)	Phase 3 (FY 2016-2020), Phase 4 (FY 2021-2026)	Phase 1 (FY 2005-2010), Phase 4 (FY 2021-2026)
Future Lanes Configuration	4 GPLs & 1 HOV each travel direction	4 GPLs & 1 HOV each travel direction	4 GPLs & 1 HOV each travel direction	4 GPLs & 1 HOV each travel direction
Barrier Mitigation Cost *	\$2,170,000 (including removal costs for existing noise barrier and privacy wall), new barrier approximately 3,100 feet long and 20 feet high on northbound side	\$3,150,000 (including removal costs for existing privacy wall), new barrier approximately 4,500 feet long and 20 feet high on southbound side	\$1,750,000 (including removal costs for existing privacy wall), new barrier approximately 2,500 feet long and 20 feet high on southbound side	\$1,890,000 (including removal costs for existing noise barrier), new barrier approximately 2,700 feet long and 20 feet high on southbound side
Estimated Cost-Per-Benefitted-Customer **	\$46,170	\$54,310	\$54,688	\$85,909
<b>Comments</b>	Customers setback from the freeway	Customers setback from the freeway	Shielded by 2 row of 30-foot tall commercial building, customers setback from the freeway	Existing berm with setback

Notes: \* The barrier mitigation costs are calculated based on city requested locations and heights, with a unit cost of \$33 per square foot. Removal costs for existing barriers and privacy walls are calculated based on \$40 per linear foot. The total mitigation cost for the 11 noise barrier sites is approximately \$17,000,000.  
\*\* The cost-per-benefitted-customer is calculated based on the assumption that all the customers within 200 feet of the barrier are regarded as benefitted customers.

TABLE 2 Continued  
SUGGESTED PRIORITIZATION OF  
NOISE REDUCTION CONSIDERATION

	9	10	11
<b>Suggested Priority</b>			
<b>Neighborhood Information</b>			
City	Scottsdale	Phoenix	Sun City West, Maricopa County
Location	SR 101 & Cactus Road, NW Quadrant	SR 51 & Greenway Pkwy, NW Quadrant	East of SR 303, Deer Valley to Robertson Drive
Date of Neighborhood	Permitted 1988	Permitted 1980	Permitted 1994
Type of Neighborhood	Single Family Home	Single Family Home	Single Family Home
Approximate Distance of First Row Homes From Roadway	250 feet	300 feet	300-700 ft
Existing Privacy Wall?	Yes, 8 feet	Yes, 6 feet	Yes, 6 ft
Existing Soundwall?	Yes, Partial, 11 feet	None	None
<b>Existing Roadway and Noise Condition</b>			
Route Name/No.	SR 101	SR 51	SR 303L
Date of Public Knowledge	7/24/1985	2/28/1987	Not Listed
Existing Lanes Configuration	3 GPLs in each travel direction	3 GPLs in each travel direction	2 GPLs in each travel direction
Existing Traffic Volume	125,000 AADT (2005)	82,000 AADT (2005)	9,800 AADT (2005)
Asphalt Rubber Friction Course (ARFC), Quiet Pavement Installed?	Yes	Yes	Yes
Measured Noise Levels Location	MON-06, SW corner, Lakespur Drive and 87th Street; MON-07, SW corner, Sweetwater Avenue and 87th Street	MON-08, NW corner of East Waltham Lane and 35th Street	MON-26, 15435 West Robertson Drive
<b>Measured Noise Level, Leq</b>			
Dominant Measured Noise Source	53 to 58 dBA SR 101	56 dBA SR 51 mainline and ramp	56 dBA SR 303L Mainline
<b>Future Freeway Improvement</b>			
Improvement Plan Phase	Phase 1 (FY 2005-2010), Phase 4 (FY 2021-2026)	Phase 1 (FY 2005-2010), Phase 4 (FY 2021-2026)	Phase 2 (FY 2011-2015)
Future Lanes Configuration	4 GPLs & 1 HOV each travel direction	4 GPLs & 1 HOV each travel direction	3 GPLs in each travel direction
Barrier Mitigation Cost *	\$2,842,000 (including removal costs for existing noise barrier and privacy wall), new barrier approximately 4,100 feet long and 20 feet high on southbound side	\$536,500 (including removal costs for existing fence), new barrier approximately 1,450 feet long and 10 feet high on southbound side	\$502,000 (including removal costs for existing privacy wall), new barrier approximately 1,000 feet long and 14 feet high on northbound side
Estimated Cost-Per-Benefitted-Customer **	\$129, 182	\$67,063	\$50,200
<b>Comments</b>	Depressed freeway, berm on side, customers setback from the freeway	Existing berm with depressed freeway	Mitigation should be considered in Final Design stage of roadway improvement

Notes: \* The barrier mitigation costs are calculated based on city requested locations and heights, with a unit cost of \$33 per square foot. Removal costs for existing barriers and privacy walls are calculated based on \$40 per linear foot. The total mitigation cost for the 11 noise barrier sites is approximately \$17,000,000.

\*\* The cost-per-benefitted-customer is calculated based on the assumption that all the customers within 200 feet of the barrier are regarded as benefitted customers.